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FOR AND AGAINST TOBACCO;

OR

TOBACCO IN ITS RELATIONS TO THE HEALTH OF

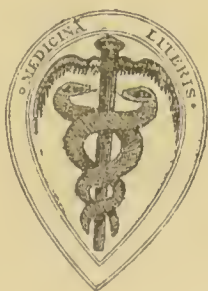
INDIVIDUALS AND COMMUNITIES.



BY

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LONDON:
JOHN CHURCHILL AND SONS,
11 NEW BURLINGTON STREET, W.

1865.

LONDON :
PRINTED BY EMILY FAITHFULL,
PRINTER AND PUBLISHER IN ORDINARY TO HER MAJESTY,
VICTORIA PRESS, 83A FARRINGDON STREET, E.C.

ON TOBACCO:

IN ITS RELATIONS TO THE HEALTH OF
INDIVIDUALS AND COMMUNITIES.

INTRODUCTION.

THE facts and inferences to be presented in the following pages, were collected, in part, in the year 1862, for a paper intended to be read at the London meeting of the National Association for the Promotion of Social Science.

Unfortunately, I commenced the inquiry too late to be able to complete it in such a way as, on becoming fully conversant with it, I thought it deserved; and it is not until the present time that I have felt warranted to speak, lest I should place myself among those numerous disputants who, ever since the days of the author of the famous "counterblaste," have spoken but have not studied.

In this work it is my intention to found every position on individual research. In some instances, truly, the research will rest on the previous labours of other inquirers, but in all cases the evidence rendered will be confirmed by new observation. Again, it is my hope to write throughout without bias. The arguments for and against tobacco, as they have been delivered, have been based on

so little real knowledge, and expounded with so much unequal vehemence, that I, for one, have never been able to come to any conclusion respecting their value; and I presume the large majority of people have felt the same difficulties, for I observe that the number of protesters against tobacco have increased in proportion to the increase in the number of smokers and in the tobacco returns of the revenue.

I need say little more by way of introduction, except to solicit the patience of readers. They must not turn to any of these papers to find dogmatic statement and the bold *ipse dixit*. They must learn as I have learned, if they would follow me. They must be content to begin with principles simply stated, and to draw conclusions from data as nearly positive as may be obtainable. Now to the work.

CHAPTER I.

ON THE COMPOSITION OF THE SMOKE OF TOBACCO.

BEFORE we can proceed to offer any remarks bearing upon the action of tobacco on the body of the smoker, it is essential that we should possess a perfect knowledge, in so far as such knowledge can be rendered perfect, of the chemical substances to which the smoker is exposed during the act of smoking. As yet, the chemistry of tobacco has been mainly written on the basis of experiments made to determine the properties of tobacco-leaf, without reference to the peculiar mode by which the leaf is decomposed in a pipe or cigar. I have not considered this procedure as fair, and have therefore followed a new plan. I constructed a small pair of bellows on a principle which made them act as the lips and chest of the smoker act in the process of smoking. The bellows, in these experiments, drew over the air in small whiffs; part of the smoke produced by the combustion was allowed to escape from the mouth of the pipe or the lighted end of the cigar, as occurs in ordinary smoking, while the remaining portion of the smoke, which in the man would be taken into the lungs, was drawn into the bellows, and subjected to analysis.

Thus, the condition of the smoker was accurately imitated, and the products to which he is exposed were carefully determined, in relation both to their quality and to their quantity.

To make the examination still more certain, different specimens of tobacco were used: different kinds of pipes were also employed—the fine porcelain bowl and stem, the small cutty, the long churchwarden, the virgin pure clay, the black odorous “coloured” clay, the meerschaum, new and “coloured,” and the wooden pipe, in different stages of its development towards what your tobacco epicure calls a “gem specimen.”

We shall see as we progress that the widest differences prevail in respect to the products arising from differing cigars, differing kinds of tobacco, and differing pipes; but it will be well, as a preliminary, to lay before the reader an account of the substances which are common to all varieties of tobacco smoke. For it is to be observed that such differences as exist are due to quantity rather than to quality, and that in every variety there are present certain bodies of which the smoke may be said to be composed.

Firstly. There is in all tobacco smoke a certain amount of *water vapour*, which may be readily condensed by passing the smoke through a glass globe surrounded by a freezing mixture; this water is always impregnated with other substances, from which it may be separated, and it varies in quantity even in the purest specimens of the plant, according to the extent to which the plant has been exposed in desiccation or drying, before it is subjected to experiment. We may consider the water as

innocuous, unless it be the bearer of soluble substances which possess active properties.

Secondly. There is present a small portion of free *carbon*. The existence of the carbon may be determined by the mere mechanical act of driving the smoke through cotton-wool. The carbon is deposited on the fibre of the cotton as a fine powder, rendering the fibre dark and dusty. It is to the presence of this carbon that the blue colour of the smoke is due. Those dense clouds which the energetic smoker blows forth, and those delicate eddies, ripples, circles, and curves, which the refined artist watches with so gratified an eye, are all due to an almost infinitesimal trace of free carbon. It is this carbon which in confirmed and inveterate smokers settles on the back part of the throat, and on the lining membrane of the bronchial tubes, creating often a copious secretion, which it discolours, and which is coughed up of dark coally appearance.

Thirdly. There is in the smoke a portion of *ammonia*. The presence of this body may at any time be proved by a very simple and ready experiment. Take a piece of white glass plate, and spread over it, in the centre, a little dilute hydrochloric acid (spirit of salt). Invert the plate over the bowl of a tobacco-pipe, charged with burning tobacco; and, holding the plate an inch above the mouth of the bowl, blow a few whiffs of the smoke over the surface moistened by the acid. The ammonia present will be seized by the acid, and converted into hydrochlorate of ammonia (sal ammoniac), or, to designate it more correctly, chloride of ammonium. On drying the fluid on the glass with a very gentle heat over a candle or before a common fire, the chloride remains on the glass as a

beautiful frosted crystalline deposit. Examined by the microscope with the one-inch lens, this crystalline deposit presents a very characteristic appearance; the crystals arrange themselves in various forms: like feathers, like daggers, or even like small swords, with here and there a finely marked and separate cube. Technically these crystals are defined as anhydrous (*i.e.*, they contain no water), having a cubical or octahedral shape. The ray-like distribution on the plate depends on the manner in which the separate crystals arrange themselves.

The presence of the ammonia in the smoke of tobacco gives to the smoke an alkaline reaction. This may be proved by using a slip of paper that has been saturated with litmus, and afterwards reddened by exposure to an acid: the reddened litmus, having first been moistened with water, has only to be exposed to the smoke issuing from a pipe, when the red colour will disappear and the paper will return to the original colour given to it by the litmus, blue. The ammonia of tobacco smoke plays a very important part: it is the ammonia that bites the tongue after long smoking; it is the ammonia that makes the tongue and throat of the smoker so dry, and induces him to quaff as he smokes, and that partly excites the salivary glands to secrete so freely. The ammonia also exerts an influence on the blood, of which more will be said in its proper place.

Fourthly. *Carbonic acid* is always present in the smoke of tobacco. This may be shown by dipping the bowl of a pipe holding burning tobacco, for a few seconds, in a long bottle containing a little fresh lime-water. After the space in the bottle above the water is charged with smoke, withdraw the bowl, insert the stopper of the bottle, and

shake the lime-water briskly, so as to bring it into contact with the vapour. The lime-water will now become of milky whiteness, owing to the formation of carbonate of lime. In this experiment the tobacco smoke must not be driven by the breath into the lime-water; for that would vitiate the result, as the breath contains carbonic acid. The amount of carbonic acid produced by the combustion of various specimens of tobacco differs so greatly that it is difficult to estimate the general effect of the acid; the inference, nevertheless, is fair that the sleepiness which follows on the prolonged inhalation of tobacco-fumes, as well as the head-ache and lassitude, are largely due to this agent, which in so small a proportion as five per cent. in the air inspired produces the symptoms specified.

Fifthly. There is yielded from tobacco smoke *a product having an oily appearance*. This substance is only partially condensable by exposure to a freezing mixture; it is also absorbed by water only in a small degree; but it appears to be all fixed by sulphuric acid, to which it imparts a dark colour. The colour of the oily product itself differs in shade according to the tobacco from which it is derived, but in a general way it has the colour of common olive oil: it constituted the substance called by Vauquelin "*nicotine*." The substance, on examination, is however found to be a compound body; and the term nicotine is now not applied to it in the manner suggested by the chemist named above. The "oil" derived from the tobacco by condensation, possesses poisonous properties. Sufficient of it may be obtained from a common Havannah cigar, weighing 63 grains, to excite poisonous, but not fatal symptoms in a rabbit. On the administration of the sub-

stance, the animal within two minutes is seized with tremors, partial insensibility, and paralysis, especially of the hinder limbs; but the symptoms pass off with great rapidity: they subside usually in from three to four minutes, leaving the animal apparently uninjured.

The "oil" (so called) derived from tobacco smoke by condensation, yields, on further analysis, evidence of the presence of three bodies, viz., a fluid alkaloidal body, called *nicotine*; a *volatile substance* having an empyreumatic odour, and an *extract* of a dark resinous character having a bitter taste. Respecting the properties of these, it may be briefly stated that all symptoms of tremor, palpitation, and paralysis, after smoking, seem to depend on the nicotine; the peculiar smell of stale tobacco smoke, which hangs so long on the breath of the smoker and on articles of clothing, is derived from the volatile empyreumatic substance; and the exceedingly nauseous sharp taste which is recognised by every unpractised smoker when he takes a foul pipe into his mouth, is due to the bitter extract. It is, I believe, this extract which creates vomiting in persons unaccustomed to tobacco, and of which the body after a time becomes tolerant.

Thus, for the production of the effects caused by tobacco on the human body, there are many and different substances: in other words, the smoke of tobacco being compound, the symptoms it produces are also compound. It has been the custom, however, up to the present time, to consider the alkaloid *nicotine* as the author, one and indivisible, of the smoker's pleasures and pains. The hypothesis is utterly groundless: *nicotine*, although one of the most potent substances, is the last, owing to the smallness of its

amount and its little volatility, to exert effects on the smoker. It is only, in fact, after prolonged smoking that it reaches the blood at all: then truly it becomes the most active poison of the group, exciting symptoms which are at all times dangerous, sometimes fatal, and which, but for the rarity of their occurrence, would have excluded tobacco as a luxury at its first origin, without any aid from the moral crusaders against the weed.

CHAPTER II.

THE FIRST EFFECTS OF TOBACCO ON THE BODY.

I placed before the reader in my last chapter an account of the different products to which the smoker of tobacco is exposed while smoking. I also noticed briefly the special effects of these different products. It may be well in the present chapter to inquire:—What are the general physiological effects of tobacco on the animal organism?

It is proper in answering this question to say *effects*, for, in truth, as I have before intimated, the smoke has a compound action on the body. It exerts an influence on the blood, on the muscles, on the brain, on the stomach; and it acts by virtue, not of one but of many substances, viz., carbonic acid, ammonia, a volatile empyreumatic principle, an alkaloid called nicotine, and a bitter extract.

The physiological evidence we possess leads us to assume, nearly conclusively, that the first impression exerted by tobacco smoke is on the blood. It is, in fact, almost certain that the products borne in the fumes (which, without alarming the most tremulous smoker, we may, for the sake of scientific accuracy, call poisons), act on the system in the precise degree that the blood, receiving them by the lungs, absorbs and retains them; and, as the different substances named are absorbed by the blood and

retained by it in different proportions; and, as the blood under various states absorbs the same substance with various degrees of power, it follows naturally that the effects of tobacco smoke are not the same in degree in different persons, nor the same in the same person at all times.

That a clear idea may be obtained in respect to the general or compound action of the smoke of tobacco, I will first describe the conditions it induces in their extreme development. I will show the order of its effects in their rapid or acute form, and from that will descend, the more readily, to the consideration of the slower, and, as they may be called, chronic effects of tobacco—those effects which are observed in persons who are said to be confirmed smokers.

The action of tobacco smoke extends to all the animal kingdom: it exerts an influence on everything living. We place a few mites from a cheese under the microscope, and direct upon them a current of tobacco smoke from an ordinary pipe. In a few seconds the little animals reel over, their limbs become convulsed, and they even appear to die; but on them the effect of the air is most active, and as the poisonous vapours exhale readily from their bodies, they recover after a time. On flies, and bees, and wasps, the same consequences may be observed, after they have been exposed to the smoke. Frogs also succumb to it but slowly, and birds very rapidly. On cats, rabbits, dogs, pigs, the symptoms produced are powerfully marked at first, and, taking into account the difference in size of the animals, the phenomena presented are the same in character. I may note, as a preliminary fact, that it is

no difficult matter to kill an animal by the fumes of common tobacco, and this even if the air be constantly changed, granting that, as it enters the chamber, it is charged with the smoke. On dogs, in fact, the fumes of burning tobacco are infinitely more potent than those of opium. Thus, if a small dog, or a cat, be placed in a chamber capable of containing three thousand cubic inches of air, and the smoke derived from a quarter ounce of shag tobacco be passed through the chamber, the symptoms of tobacco poisoning will show themselves within the first fifteen minutes, and in from half to three quarters of an hour death will take place. The symptoms, from inhalation in a similar way, will also show themselves quickly in man, although the experimentalist be inured to smoking. I myself once inhaled the product from one pipe holding sixty grains of tobacco, the said product being diffused through five-thousand cubic inches of common air; within four minutes the signs of specific tobacco poisoning set in, and I was compelled to desist.

In different cases of tobacco poisoning the same symptoms are always present, but they are not always each and every one present in the same degree. The quality of the tobacco, the character of the pipe, the state of the smoker—nay, the temperature of the room in which the poisoning takes place, cause differences in detail. Still, the symptoms are sufficiently blended in most instances to admit of being followed out with fair precision.

Inasmuch as the first impression is made on the blood, and inasmuch as the whole volume of blood courses through the body in from three to five seconds, the first symptoms of tobacco smoking are felt universally.

There is said to be an "all-overishness," by which term, bad as it is, a great deal is implied. After a short time, as the blood becomes saturated with the poisons, the more vascular organs, and those which have the most active functions, become powerfully impressed. The stomach is the first to give indication of suffering; and an effort is made through that organ to eliminate certain of the offending substances. If the poison cease to be taken in at this point, or if the quantity that has been received be not immoderately large, recovery commences. The surface of the skin resumes its ordinary colour and temperature, and after a few hours the ordinary functions of life are once more naturally performed; for tobacco is not a poison that leaves important disease of any particular organ or class of organs in its track; if it did, that mischief, which would soon have been detected by physicians, would have excluded it long since from the list of luxuries.

If the process of poisoning be continued beyond the point to which we have followed it, the brain and nervous system next become affected: there is now presented an inability to stand steadily, and to make a sure grasp of objects near: the body seems to whirl and all things around to reel—effects which are soon followed by involuntary action of the muscles, and convulsions which are often intensely painful. In extreme cases, this muscular spasm extends to the muscles of the chest and to the heart, and thereupon succeeds a deathly faintness and tremor. I once saw a boy, who, on "learning to smoke," induced in himself, from the first few pipes, these signs in a degree that was most painful to witness: his heart having nearly

ceased to beat, his sensation of impending death was terrible, while through his chest—which was spasmodically fixed, as if surrounded with an iron band—whenever he attempted to breathe there darted a pain short and sharp as a shock from a powerful galvanic pile. These spasmodic seizures lasted for many hours.

Pushed to an extremity, the symptoms terminate in death: and in the lower animals the death invariably is due to arrest in the beating of the heart: in the human subject, if fatal symptoms supervened, they would be due to the same cause.

In common conversation we speak of tobacco as a narcotic poison, and the anti-tobacconists are everlastingly dinging into our ears their statements respecting the effects of this terrible “stupefying” drug; but, in truth, the idea that tobacco is a narcotic is as false as it can be: tobacco is no more a narcotic than is strychnia; if it were, it would be infinitely a more grateful friend at first sight than it is. Your true narcotic is really a seducing body, that asks you to apply to it again, with a meaning that is pleasant at the time, and not unpleasant afterwards to the recollection; but tobacco raises its victim’s whole soul into a fervour of abhorrence. It is so candid that it tells you at once, “I am a devil, and these are my tortures: try them again, if you dare.”

For my own part, I have luxuriated in a bath of laughing gas; I have been under ether and chloroform; and once, by an accident, in which Battleys’ solution of morphia was given me, in a mixture, in mistake for tincture of bark, I tasted opium freely, and I know from these experi-

ences what a true narcotic is. I can recall at any time the visions produced by the laughing gas and the opium; how to the mind all the universe seemed enlarged, and space lost in space; how in what was but a second of time centuries were first closely enrolled and then expanded into vast history; how every sense was exalted, and imagination seemed so far set free that the dull body was left behind, having no control, and subject to none; and the visions thus recalled are something to think upon, like visits to magnificent pictures, or great cathedrals, or unrivalled landscapes, or opera in its highest art. But the recollection of these by the recollection of tobacco poisoning, is to compare the extremes of happiness and torture—incarceration in cutting irons in a Southern slaveholder's worst cell, with a banquet at the Crystal Palace on a fine day of July, in the company of England's merriest men and best scholars.

I have digressed for a moment, but the digression is pardonable if the fact be impressed on the mind, that tobacco is not a narcotic; that is to say, that it does not remove sensation, nor excite pleasurable emotion.

The symptoms called into existence by the rapid inhalation of tobacco smoke may be produced in the same degree by a different mode of administration. If instead of letting the fumes pass into the lungs of a man or animal, we condense them by drawing them through a globe surrounded by a freezing mixture, we obtain in solution all the products, minus the carbonic acid gas, and a portion of the ammonia. If this solution now be given by the mouth, the same symptoms are induced

as by inhalation, but with this difference in regard to time, that they are immediately developed. Thus the fluid condensed from one good Havannah cigar is capable of inducing in a rabbit active convulsions without death, while the fluid condensed from six ordinary pipes of common shag tobacco, smoked precisely as a man would smoke them, is sufficient to destroy a rabbit within three minutes after the administration.

There is one other point to be considered in this chapter. It will be asked, what are the conditions of the organs of the body during the time that a person who is learning to smoke is undergoing his penance? As regards the human body, neither I nor any other physician could speak with certainty, for the facts have not been observed; but from analogy derived from the inferior animals, which analogy must be very perfect, the conditions of the vital organs are as follow:—The brain is pale and empty of blood; the stomach is reddened in round spots, so raised and pile-like, that they resemble patches of dark Utrecht velvet; the blood is preternaturally fluid; the lungs are pale as the lungs of a calf, as we see them suspended in the shambles; while the heart, overburthened with blood, and having little power left it for its forcing action as a pump, is scarcely contracting, but trembling as if, like a conscious thing, it knew equally its own responsibility and its own weakness. It is not a beating, but a fluttering heart: its mechanism is perfect, but each fibre of it to its minutest part is impregnated with a substance which holds it in bondage and will not let it go.

Tobacco, then, if it be a friend, is not very friendly at the first introduction; fortunately, or unfortunately, it becomes

milder as it grows more familiar ; but for all that, if any person who was asking himself whether or not he should cultivate its acquaintance, had seen what I have seen, he would surely decline the honour, and that, even though he might know of certain after advantages from the friendship, to which we shall be led in due time.

CHAPTER III.

THE SLOW EFFECTS OF TOBACCO SMOKE ON THE BODY.—INFLUENCE ON THE BLOOD.

THE body, after being subjected for a few times to the poisons of tobacco smoke, becomes accustomed to their influence, and ceases to offer any of the immediate and active signs of opposition. There is set up what is technically called “a tolerance,” and the direct mischief seems to be over. The “tolerance” thus brought about is not peculiar to tobacco as a poison. There are many other substances which in like manner are tolerated after a time. Antimony, as a ready example, is one of these: there is no poison more sickening, more depressing than antimony when it is first taken; but very soon it ceases to exert its active properties, and can be swallowed in moderate doses for a long time, though a poison—tolerated, and apparently little hurtful. Some mystery has been made to surround this change by which tobacco and other poisons become endurable; but in truth there is no necessity for any mystery or any difficulty. The fact is that the animal organism is formed to adapt

itself to many impressions and influences, which at first sight are objectionable, by virtue of a physical power it possesses of getting quickly rid of the offending bodies, and relieving itself of them. This occurs in respect to tobacco. After a short time the products of the tobacco find a ready exit out of the system. They are thrown out by the three great eliminatories—the lungs, the skin, and the kidneys. The volatile matters exhale by the lungs. We have evidence of that in the empyreumatic and ammoniacal breath of every heavy smoker. In confirmed and inveterate smokers, their every garment, after a short wearing, becomes impregnated with the smell of tobacco; and we say that the smoke hangs about their clothes, as though the smoke had simply fallen on the clothes from without; but this is not quite the fact: the vapour has in truth largely exhaled from the skin, and saturated the clothing. For the same reason the clothes of some moderate smokers are intensely fumigated; so that into whatever company they go, and however they may dress, they bear with them the evidence of their indulgence. A gentleman who was a very moderate smoker once consulted me on this subject, telling me, “If I smoke but a single pipe or cigar, I carry it about with me for half a day, whereas my brother smokes a dozen pipes and nobody would suspect half an hour afterwards that he had smoked at all;” and these observations are commonly made, although the causes of the phenomena are not understood. Nevertheless, they may be understood. When the smoker carries about with him the odour of a single pipe, he has some defect in his breathing apparatus: he cannot eliminate by his lungs the volatile

empyreumatic product and the ammonia with the rapidity he should do: so these hang about his breath, and the skin doing more work than is natural to it, in order to relieve the lungs, the tobacco products pass off by it, saturating the clothing and concentrating the perfume. Thus one of our old herbal books says of tobacco: "It were a fine cure for asthmatics, did it not render them much more disagreeable to politeness than it doth other men who do attach themselves to it the more."

Every smoker is cognizant of the circumstance that there are times when he himself is more redolent than he ought to be, and of times also when his appetite for the weed is reduced to a minimum; and, if he inquire into the cause of this, he discovers it to be due to an arrest in some active secretion. He says usually in such cases that "his liver is out of order," which is a sufficiently uneducated way of speaking for the physiologist, but which conveys, nevertheless, to his mind a series of perverted functional changes that are now pretty well understood as indicating suppression of function in the lungs.

We thus account for the removal from the body of the volatile tobacco poisons; but what of the nicotine and the bitter extract? At the temperature of the body, nicotine cannot be considered a volatile substance, and the bitter extract is a soluble solid. Both of these substances enter the body by being carried along the stem of the pipe, combined with water, into the mouth, to be afterwards swallowed with the saliva. These, then, enter the body in solution, and so they leave it; they, I believe, are carried out entirely by the kidney, the grand eliminator of all poisons of the soluble type.

We sum up therefore, all that may be said respecting the "tolerance" of the poisons of tobacco smoke, by saying, that in the body accustomed to them they are removed, unless they be indulged in indiscriminately, or unless the body be diseased, nearly as rapidly as they are absorbed.

With the facts we have stated impressed clearly on the mind, we may follow out with reasonable understanding the effects of slow tobacco poisoning on the body. In brief, the effects are transitory; the influences exerted are functional, not organic. In the confirmed smoker there is undoubtedly a constant functional disturbance; his organs, *i.e.*, are doing work which is not essential to their duties, but they do it with moderate ease: they receive nothing that is deposited in their structure, and, let alone, they soon regain their natural condition. In the recognition of these simple truths, the whole gist of the tobacco controversy is enclosed; it is on the presence of the functional disturbance that the vehement anti-tobacconist bases his arguments; it is on the absence of organic mischief that the advocate of tobacco rests his defence.

We may turn at this point to consider, in detail, what are the functional disturbances to which the smoker is subjected. These are presented, with more or less of distinctiveness, in the blood, in the stomach, in the heart, in the nervous system, and in the glands of the throat and mouth. On the blood, the prolonged inhalation of tobacco produces changes which are very marked in character. The fluid is thinner than is natural, and in extreme cases paler. In such instances the deficient colour of the blood is communicated to the body altogether, rendering the external surface yellowish white and puffy.

The blood being thin, also exudes freely, and a cut surface bleeds for a long time, and may continue to bleed inconveniently, even in opposition to remedies. But the most important change is exerted on those little bodies which float in myriads in the blood, and are known as the red globules. These globules have naturally a double concave surface, and at their edges a perfectly smooth outline. They are very soluble in alkalies, and are subject to change of shape and character when the quality of the fluid in which they float is modified in respect to density. The absorption, therefore, of the fumes of tobacco necessarily leads to rapid changes in them; they lose their round shape, they become oval, and irregular at their edges, and instead of having a mutual attraction for each other and running together, a good sign of their physical health, they lie loosely scattered before the eye, and indicate to the learned observer, as clearly as though they spoke to him and said the words, that the man from whom they were taken is physically depressed and deplorably deficient both in muscular and mental power.

But with all this, it is marvellous to observe how quickly the blood will regain its natural characteristics on removal of the poison. One night's rest is sufficient to remove the evil, and restore the fluid to its natural state; the poisons fly, and nature rights herself.

The facts here given are derived from the direct observation of the blood of smokers in, I may say, every phase of poisoning by tobacco, and I believe they fairly represent the influence of the smoke of tobacco on the blood: but before I quit this subject I would point out that the effects produced vary exceedingly according to

the manner in which the tobacco is smoked. If the body is fasting, the effects are much more rapidly developed, and the fact is very important, as it accounts for the well-known circumstance that the majority of smokers fail to smoke easily on an empty stomach. Again, the effects are brought out with far greater intensity when the smoker indulges in a room the air of which is strongly impregnated with the tobacco poisons; and the reason of this is obvious, for under the condition named, the smoker is inhaling over and over again the finely distributed volatile matters with which the air is charged, while at the same time he is unable to throw off freely the products of his own respiration. Lastly, if a large quantity of fluid is imbibed during prolonged smoking, the changes in the blood are greatly increased, and are made to continue a longer time; for the fluids dilute the blood and dissolve and fix the poisons, and render their elimination more difficult.

CHAPTER IV.

THE EFFECTS OF TOBACCO SMOKE ON THE STOMACH AND HEART.

IN the last chapter I pointed out that the slow effects of tobacco on the body are presented with more or less of distinctiveness in the blood, in the stomach, in the heart, in the nervous system, and in the glands of the throat and of the mouth, and I concluded by describing the specific action of the poison on the blood. In the present chapter I shall refer to the influence exerted by it on the stomach and heart. On the stomach, tobacco produces, even in the most confirmed smokers, marked deviations from the natural condition. Unconsciously, these smokers lose to a considerable degree their natural appetite. They feel, as it is said, that the pipe not only takes away hunger, but appears to sustain them in the absence of food. This is not mere fancy, for tobacco, as it impairs the oxydation of the body, also in proportion prevents waste. In so doing, however, it lessens the activity of all the organs, and therewith the organic power. The effects on the stomach are twofold,

and arise from two distinct poisons. Within, the stomach is lined with a delicate membrane, called mucous membrane, from which the gastric or digestive secretion is derived, and on the healthy structure of which good digestion depends. Outside to this mucous membrane, the stomach is surrounded with layers of muscular fibre, which in the act of digestion are in rapid motion, bringing the food mechanically into contact with the fluid that is to dissolve it. The influence of tobacco extends to both these structures. The bitter extract of which I have already spoken, and which so readily excites vomiting in the young smoker, appears to act at all times with more or less of violence on the mucous lining. At first it produces great irritation, redness, and injection; after a time the changes are subdued, but are not entirely removed. The membrane secretes irregularly, and, as a general rule, does not produce the due amount of gastric fluid; hence digestion is impeded. After digestion, acrid fluid is left in the stomach, which irritates and gives rise to heartburn, eructations, and frequent nausea, with almost constant sensation of debility of the stomach, sometimes attended with cravings for particular foods, especially those which have an acid reaction, such as pickles and fresh fruits. The muscular portion of the stomach is acted upon entirely by the nicotine. In small quantities, the nicotine excites a slight movement in the muscular fibres, not only of the stomach, but of the other parts of the alimentary canal; from which cause, in moderate smokers, tobacco acts as an aperient, and in this sense is sometimes even useful. Carried to excess, however, nicotine produces a palsied condition of the muscular fibres, leading to great increase

of debility in the digestive organs, to a serious impairment in their functions, and to constipation.

Like the blood, the digestive organs, on being relieved from the pressure of the poison, quickly regain their activity; for there is no evidence to support the idea that an actual organic change of structure is produced in them. But inasmuch as they are the organs through which the vegetative life of the man is sustained, it must be admitted, that so long as they are functionally disturbed, so long the whole of the body, looking to them as it does for the sources of supply, is held, proportionately, in want and exhaustion; and if at the same time the waste were not, to a certain extent, prevented, that exhaustion would soon be increased even to danger.

I have already shown that nicotine and the bitter extract of tobacco travel along the stem of the pipe, are absorbed directly by the mouth, and are thence carried into the stomach by the act of swallowing. This is an important fact to bear in mind, as it explains the different degrees of action of different kinds of pipes out of which tobacco is smoked. A long, perfectly clean pipe, composed of a material like clay, which easily absorbs the two bodies specified, may be smoked even by the moderate man with partial impunity; but it requires a very confirmed smoker to tolerate the black dirty bowl and stem, charged to the mouthpiece with the more poisonous products; and in proportion as the toleration is borne, the digestion is sacrificed. Indeed, I do not believe it possible that any man can constantly smoke a foul pipe without being as constantly a martyr to extreme dyspepsia.

Again, different kinds of tobacco exert a different influ-

ence on the smoker, owing to the causes I have named. Some tobaccos, such as Cavendish, pigtail, and coarse shag, yield the fluid products to which I have drawn attention, in a much greater degree than Latakia or Turkish; hence the latter are called mild tobaccos; and although in smoking them they may produce dryness of the tongue, from the ammonia evolved, yet they do not upset the digestion materially, or nauseate, unless they are very indiscriminately used. Cigars, if they are "good," produce dyspepsia very quickly; for in smoking them, unless a long mouthpiece be used, nicotine is inevitably absorbed.

The influence of tobacco on the heart, has been very differently estimated by different writers. Some have conceived that its influence is entirely imaginary—others that it is most dangerous. The truth again lies, in this case, in separating functional from organic mischief. I do not think there is any evidence to show that tobacco alone is capable of producing structural change either on the valvular mechanism, or the muscular fibre of the heart; on the contrary, I believe that in persons strongly disposed to rheumatism and gout—diseases which arise from the presence and accumulation of acid matters in the blood—the tobacco, from its alkaline reaction, is rather a preventive to structural change in the heart than otherwise. I speak with diffidence on a subject which scarcely admits of demonstration; but yet I feel that I have had evidence and actual experience of the fact named. Once more; in persons who, either from necessity or ignorance, subject themselves to an unnatural degree of muscular exercise, and who make, as a consequence, egregious demands for labour on that pulsating organ which knows no rest; in such I believe the influence of a pipe daily (I do not mean of many

pipes), is beneficial rather than otherwise. In these, the tobacco puts a curb on the extra excitement, and acting as a sedative on the heart, prevents its over-action, and arrests its excessive development.

Nay, strange as it may appear, I am inclined to believe that tobacco, instead of increasing the evil effects of alcohol on the heart, renders them less determinate; for alcohol tends to create fermentative changes in the stomach and alimentary system, and to give rise to those acid modifications of blood on which the more serious organic diseases of the heart mainly rest; while the tendency of tobacco is to stop these changes. Alcohol also excites the action of the heart; tobacco subdues it. Thus, if two men sit down together and take an equal quantity of spirituous drink, and if one smoke, and the other do not, the action of the heart will be much less increased in the smoker. I do not, of course, put this forward as an advantage, because it is very foolish for any one to take alcohol in excess; but I name the fact in its simple meaning, as a fact. So much for the influence of tobacco on the structural diseases of the heart; the rule varies when we turn to the functional derangements of the organ. There cannot be a doubt that inveterate smoking interferes very seriously with the contractile force of the central organ of the circulation. No one can observe the influence of nicotine on the heart, after its administration to animals, without feeling assured that nicotine imbibed from a pipe creates a paralysing effect, giving rise to irregularity of action, faintness, and sometimes to symptoms which, though not fatal, are for the time sufficiently alarming. I pointed out this fact some years ago, and it has lately been very ably commented upon by M. Beau. The conditions brought

about by tobacco in this way, come on, often suddenly, and last for many minutes, or even for an hour at a time. The symptoms are characterised by palpitation, a sensation as though the heart were rising to the throat, a feeling of breathlessness and of insupportable pain in the region of the heart; pain of a spasmodic kind also extends over the muscles of the chest, and occasionally to the arms, especially to the left arm. M. Beau has related a series of examples of the kind, and I can confirm his observations fully, although I have never seen death actually produced from this cause. My friend Dr. Edmunds has given me the particulars of a remarkable case of this nature, in which the attacks regularly followed every indulgence in prolonged smoking, and which subsided altogether when the habit was suspended. I presume that every practical physician, who is observant, has met with similar experiences.

But here again the symptoms induced depend on peculiar circumstances. To secure their development immoderate smoking is essential; and here too, the character of the pipe and of the tobacco used play important parts. The foul pipe, the strong tobacco, and the strong cigar, are the agents which tell most effectually and seriously. Further, there seem to be conditions of body which favour the action of the poison. When, for instance, the muscular system, including of course the heart, which is a muscle, is greatly fatigued or oppressed, as after excessive exercise or mental distress, or when, as M. Beau says, the secreting organs of the body are deranged, so that the nicotine cannot readily make its escape, and therefore accumulates in the blood, then paralysis of the heart more readily supervenes after indulgence in tobacco.

CHAPTER V.

THE EFFECTS OF TOBACCO SMOKE ON THE NERVOUS SYSTEM AND ORGANS OF SENSE.—VISION.

WRITERS against tobacco have dwelt with more than usual emphasis on the question of the influence of tobacco on the nervous system. They have presumed that from the use of this agent, Insanity, Paralysis, Epilepsy, and various minor maladies connected with the nervous system, result. I am inclined myself to the belief that statements to this effect are mere imaginings. They have been made without any reference to statistical facts; they have emanated from men who have been indifferently cognizant of the phenomena of disease; and have apparently been put forward, rather with the laudable but mistaken intention of alarming inveterate smokers, than of announcing any scientific induction.

At the same time, it is to be admitted that tobacco smoking does, when unduly indulged in, create disturbance in the functions of the nervous organs; for here the same rule obtains as obtains in respect to the stomach and the

heart; there is derangement, but not organic change. At all events, after looking most carefully into this question, from observations made on the ailments of smokers on the one hand, and on the causes of the symptoms manifested by persons affected by diseases of the nervous system on the other, I can come to no different conclusion from that drawn above.

The effects really manifested through tobacco on the nervous system, are of two kinds, or perhaps we may say, of three kinds, viz.:—*Sensual*, or those which are manifested through one or other of the senses; *Cerebral*, or those which show themselves through the brain itself; and *Nervous*, or those which are developed in the minuter portions of the nervous system, in the nerves proper.

In every case the symptoms presented are indicative of a low condition, of a deficient nutrition in the nervous structures. When the symptoms are exhibited through the senses, this fact is well marked. After long indulgence, if the eye be the organ influenced, there is a difficulty and obscurity of vision; in reading, for instance, the letters become confused and the lines dance, as it were, before the reader; sometimes, too, bright images appear, and small luminous specks float in the sight on looking into space. I have heard also, complaint made of deep-seated pain in the eye, particularly on looking at white objects, and I have even known dizziness and nausea produced by overstrained action of the eyes during this irritable condition.

In inveterate smokers the pupils usually are unnaturally dilated, and this dilatation increases during smoking.

This effect is due to the absorption of nicotine; for I have observed the same dilatation follow the action of nicotine simply. If the light is low, this dilatation of pupil produces but little embarrassment; if, on the contrary, the light is strong, vision is greatly impaired for the time; indeed, the light cannot be borne as in health. The influence exerted by the nicotine is directed in this case on the circular muscular fibres, by the action of which the aperture of the iris is closed. These fibres are, I think, paralysed by the nicotine in the same way that we have seen the muscular fibres of the stomach and heart paralysed by the same agent. On this, the radiating fibres by which the aperture of the iris is opened are allowed passively to contract, and the pupil or opening is unduly dilated.

But the symptom which of all others marks, through vision, the fact that tobacco is acting injuriously, is the long retention of images on the sensorium after the eye itself is withdrawn from them. I knew a smoker once who after long indulgence could retain a faint image of any bright object on which he looked for so long a period as six minutes after the eyes were closed upon it. If, for instance, he looked at the window in the daylight, the picture of the window was impressed on his retina and remained there in miniature, the panes of the window being filled up with what seemed to him red light, while the bars were dark. I have observed the same phenomena in my own person, not only after tobacco, but after experiments with nitrous oxide, and ether. If a bright light, such as a lamp or candle, be placed before the eye, the impression also is retained, but no image is retained that

has not a certain size and luminosity ; letters of books are lost, as also are the minutiae of objects which present many lines or figures. That the symptom here spoken of may arise exclusively from smoking is proved by the fact, that it begins and is intensified during the act, and gradually dies away as the cause is withdrawn. Whenever it appears, it is a good indication to the smoker that he has gone far enough, at least for that time.

If the observations I am about to make are correctly understood, I do not think there will be any difficulty in comprehending why the picture of an object should be retained in sight in the manner described. I shall have occasion some day to show that the retina of the eyeball is, in fact, virtually a photographic surface, and that the eye, as an instrument, is the same to its owner as the camera is to the photographic artist. Now, in health, when the oxydation of all the organs of the body is perfect, the picture formed on the retina is absorbed, or perhaps it were better to say, is transmitted instantly to the brain, where we may almost regard it as photographed again. When, however, from any circumstance, the oxydation or nutrition, or, in other words, the molecular motion of the retina is impeded, then the image is not immediately transmitted, but is held, as it were, on the surface for a time—gradually fading away.

In my experience I have not seen any worse results than those that have been named ; but it is stated by some authorities that after inveterate smoking actual wasting of the nervous structure of the eyeball may occur, and that permanent blindness from the disease known as amaurosis may be the consequence. My friend, Mr. Words-

worth, who is one of the able surgeons to the Royal Ophthalmic Hospital, takes this view, and produces occasionally to his class, patients who, in his opinion, are suffering from "tobacco amaurosis." He adduced an instance of this kind on the 25th of March of the present year, in which case a strong man who had followed no kind of occupation likely to injure his sight, and who seemed to be in good health, was partially blind, owing, as Mr. Wordsworth thought, to inveterate smoking. This man, eight or nine years ago, commenced to smoke, and continued increasing the habit until he indulged in not less than half an ounce of strong tobacco a day. His pupils were widely dilated, the iris—the curtain for admitting or excluding the light—acted most imperfectly, and the discs of the optic nerve were partially wasted.

It would be a departure from, or rather a suppression of, truth, if I had omitted to state the conclusions at which Mr. Wordsworth has arrived, and it must be confessed that the instance he has given has a formidable aspect. The only answer I can make to it, is this: that as he seeing the symptom has traced it upwards to a supposed cause, I, after observing the effects of that supposed cause in an immense number of cases, have never witnessed the same extreme symptom; have never, in short, detected anything beyond functional disturbance in the vision of the smoker.

CHAPTER VI.

THE EFFECTS OF TOBACCO SMOKE ON THE NERVOUS SYSTEM AND ORGANS OF SENSE, CONTINUED.—THE SENSES OF HEARING, OF SMELL, AND OF TASTE.

FROM the eye we may turn to the ear as one of the other organs of sense assumed by some to be affected by tobacco. In respect to this organ and the modifications to which it is subjected in the smoker, the same rule, in my opinion, holds good as that which relates to the eye. I have no doubt as to the existence of functional derangement of the sense of hearing after long indulgence in tobacco, the change being manifested by certain well-marked phenomena, which phenomena usually attend, and are coincident with, the disordered state of vision and the general signs of indigestion which have already been described. The specific symptoms affecting the hearing are at first those of confusion and an inability to appreciate distinctly sounds that are either very soft or unusually loud. This inability gives rise to restlessness and uneasiness on the part of the listener, who often asks questions with respect to articulate sounds which to others present are perfectly and distinctly heard. After a short period, another symptom appears, viz., a sudden

sharp ringing in the ears. This symptom will occur not necessarily during smoking, but at intervals afterwards. Sometimes, if attention be carefully paid to the subject, it may be discovered that some external noise, very slight in character—such as the ringing of a distant bell, or the whistling of the wind through a chink, or some far-off musical murmur—has produced the sound that is heard with so much exalted intensity by the sufferer. At other times, the symptom comes on apparently without any provocation; the man is reading, walking, eating, or is engaged in some amusement, when suddenly there darts through one or other ear, a sharp, shrill, drilling ring, which always seems to come from without, and lasts often for two or three minutes at a time. No pain attends this phenomenon, that is to say, no actual ache, although the annoyance is extremely great. Strangely too, the ear is not deaf during that time, for, if a watch be placed to it, the ticking is very distinctly heard; and still more curiously, both ears are scarcely ever affected at the same moment. If the symptom be very much prolonged, it may be attended with giddiness and nausea, but in the majority of cases, after running through three stages (a commencing, an intensified, and a declining stage), it abruptly terminates.

As regards the cause of this phenomenon, I trace it to the same source as that to which the impairment of vision may be attributed; it appears to me that, in these cases, the ear becomes highly susceptible of external impressions, and retains these much longer than is its wont in health; during the period of the phenomenon the tympanum, or drum, is undergoing a series of rapid vibrations,

which the irritable nervous expanse within the ear is absorbing, is retaining too long, and is transmitting to the brain too feebly. In plain words, the physical impressions made on the nervous expanse of the ear, like those which are made on the retina of the eyeball, are for the moment fixed so that they remain. If this be true, it follows necessarily that the sound is always, as it seems to be, from without; I mean, that something has occurred to set the air in vibration within the sphere in which sound can be heard, and that the intensified effect is due, not to any organic change in the structure of the ear, but to derangement and exaltation of the functions of that organ.

The same phenomena are met with under other circumstances. In the early stage of chloroform sleep, in fever, under the influence of haschisch and opium, persons experience strange sounds, compared by them to the sounds of a shrill whistle, of a railway engine whizzing briskly past them, or of a bell ringing sharply and near to them. To the bystander it may seem that these sounds are altogether formed in the mind, but if they are carefully noted in his own person by a careful experimentalist, it comes out that there is a cause for everything that is heard, and that the auditory sense has simply exaggerated an external sound.

In my experience I have never known the effects of tobacco to be carried beyond the extremes named; but here again it is but fair to state that other observers have, or think they have, seen much more extreme effects; thus M. Triquet has within the last few weeks called attention to a severe and indeed incurable form of deafness from

paralysis, attributable to intemperance and the immoderate use of tobacco. According to this author, the person suffering from the malady described by him, is, in general, suddenly disturbed at night by a hissing sound in both ears, analogous to the tinkling of metal. This phenomenon decreases in the course of the day, but returns after meals, especially in the evening, and uninterruptedly persists throughout the night. The slightest noise causes pain, and even the suppressed murmur of conversation is distressing; the patient stops his ears with cotton, or with the tips of his fingers, not only in the street, but at home, in the midst of persons whose voices have long been familiar. This condition may last a few days or weeks, a month or two at most, and is immediately followed by the symptoms of the second stage, that of depression.

The subject congratulates himself at first upon what seems to be an improvement. The ringing has much diminished, and may even have entirely ceased. The distress occasioned by noise and sharp sounds is replaced by an opposite condition. The patient now seeks loud conversation, and complains that he is addressed in too low a tone. This deceitful amelioration lasts, however, but a short time, the last period of the disease is at hand, and sometimes suddenly, in the course of a night, the patient, to the surprise of all his friends, becomes stone-deaf.

This third, or paralytic stage, is the longest and most distressing, and—with some few exceptional cases in which, by timely medical interposition, some amendment is effected—the more or less complete abolition of the sense of hearing, which is the leading symptom, obstinately persists with all its evil consequences, cutting off the patient

from all social intercourse, and inducing a state of melancholy which occasionally leads to self-destruction.

This kind of deafness is not unfrequently accompanied by debility or perversion of some other organ of special sensation. Thus M. Triquet in such cases has often met with amaurosis conjoined with marked vascularity of the retina and optic disc; and although vision is not impaired in the same degree as hearing, it has, even in the young, lost a considerable amount of its power. Smelling is also more or less obtuse; a fact to be accounted for by the numerous communications existing between the nerves of these various organs. In some few instances, a marked diminution of the intellect, and vacillating movements in walking, indicate the propagation of the injurious effects of tobacco and alcohol to the brain and spinal cord.

In some instances, in addition to the symptoms already described, M. Triquet says that a purple redness is also present at the back of the throat, together with irregularly raised growths, small in character but giving a roughness to the surface; when these signs appear, the evidence as to the cause is, in his opinion, complete.

Respecting the theory thus advanced by M. Triquet, I believe that he has made but one error, which is, however, by the way, a vital one. He has mistaken *coincidence* for *cause*. I have seen precisely the same symptoms as those mentioned by him coming on in smokers in the same way, and running the same course, but I have seen them equally well marked in persons who have never smoked at all. They are as frequently found in women as in men, and perhaps more frequently. They may be induced or exaggerated by constant indulgence in alcohol; they may, perhaps,

under such circumstances be increased by tobacco; but they may also arise from other causes, from great mental anxiety and over-work, from exhaustive diseases, from old age. When they are present, it will usually be found that the person who presents them has a feeble, unsound heart, and early symptoms of disease of the vessels of the brain. Hence the disease named is a general, as apart from a special disease arising from one particular cause; it may be presented in persons who do not smoke, it may be presented in persons who do smoke, and it may be absent in persons who smoke immoderately; surely, therefore, it is not fair, it is not truthful, to say that the malady is one of the direct evils consequent on the use or abuse of tobacco.

With the exception of the senses of sight and hearing, there is but little to be said further regarding the influence of tobacco on the sensual organs; it is probable, however, that after long smoking both smell and taste may, to a certain degree, be impaired. But the rule is not general, for I have known many confirmed smokers who have possessed the most keen olfactory sense—a sense infinitely more acute than in persons who had been unaccustomed to the pipe. The case is different in regard to snuff. It is not to be denied that constant snuff-taking does destroy, and sometimes completely, the sense of smell. I do not know that I can recall any one example in which indulgence in tobacco has produced paralysis in the nerves of taste. I have read of cases of the kind, but on inquiry have never yet met with them in fact; hence I am compelled to assume that they are either extremely rare, or that the statements regarding them have been based altogether on insufficient evidence. This remark applies also to the sense of touch.

CHAPTER VII.

THE INFLUENCE OF TOBACCO ON THE MENTAL FACULTIES.

FROM the organs of sense we turn naturally to the brain itself, and we ask the question: "Does smoking tend to produce cerebral disease and its train of consequences?" On this point we have had the most extreme statements on both sides. We have had it stated by those who oppose tobacco, that the luxury produces congestion of the brain, dulness and heaviness, softening, apoplexy, epilepsy, vertigo, chorea—St. Vitus' Dance—and various other serious evils. On the opposite side, these assertions have been most strenuously denied by able physicians and competent scholars. In like manner, as regards the effects of tobacco on the mental faculties, it has been asserted, on the one hand, that the drug stupifies, and makes all who play with it dull; while it is affirmed, on the opposite side, that it sharpens the intellect, and often enables the man of learning to solve difficulties which to him were before obscure. It was affirmed last year that in a military college in France, where there are two classes of students—one class that smokes, and another that does not smoke—the abstainers

bore away all the prizes, and showed themselves to be by many odds the ablest workers. It was urged immediately afterwards, in opposition to this statement, that the Emperor Napoleon, whom some consider the ablest man in France, and who is certainly not wanting in a certain kind of perceptive and resolute thought, is a determined smoker, and on the Italian war-fields adhered to his cigar far more pertinaciously than to any other part of his equipment; and the labours of various eminent Germans have been adduced on the same side. At the last meeting of the British Association for the Advancement of Science, Mr. Reynolds advanced various views against tobacco, basing his objections mainly on the injury it inflicted upon the organs of thought. To him, the President of the Physiological section, Dr. Paget, retorted sharply, condemned the whole argument as unworthy of a scientific society, and asserted that in his course of life as a student, more particularly while he was a student in mathematics, he found over and over again the most difficult problems resolving themselves most easily under the genial influence of a pipe.

It is difficult at first sight, and indeed impossible without great consideration, to discover the source of these discrepancies; but when the subject is examined carefully, and without bias, the difficulties clear up, by learning that the extreme and exaggerated view entertained against tobacco, and to which reference has just been made, is, in truth, altogether romantic; it is based on no statistical evidence whatever, and rests only on the prejudiced induction—I beg pardon, I mean illusion—that because certain symptoms occur in persons who smoke, therefore

those symptoms are due to the tobacco and to nothing else.

Respecting the dangerous diseases of the brain which are said to result from smoking, we soon discover, on sound acquaintanceship with them, that the hypothesis entirely loses its ground. Taking apoplexy into consideration, we learn, in proportion as we become acquainted with the meaning of the term, that it is difficult to fix it as a disease, according to its original acceptation; and when one does trace it rigidly home, one discovers in it no kind of necessary connexion with the indulgence of the smoker. Looking back through a rather extended experience, I find that out of seventy cases where persons have died suddenly, as it has been thought from apoplexy, not more than nine—I refer now to individual observations—have really been proved to have been cases of true apoplexy; and of these nine, five were in women who did not smoke, three in men who did not smoke, and one in a moderate smoker; while amongst the hundreds of smokers whom I have specially examined, I have never seen a single individual who has suffered from apoplectic seizure. I cannot, therefore, for a moment allow that smoking, of itself, produces apoplexy; and without entering into any details, which would only tire the reader, the same general rule applies, according to my observations, to epilepsy and St. Vitus' Dance.

I cannot say so much in favour of tobacco when the disease called vertigo is mentioned. I have undoubtedly seen in examples of extreme indulgence, where there is confusion of vision and ringing in the ears, such as has been described, an accompanying symptom of giddiness and

unsteadiness, which is commonly known under the name of vertigo.

It may be that this sign is dependent, to a great degree, on the aberrations of function in the organs of sense, and that the brain itself is not seriously affected. Nevertheless, I can conceive that whatever would influence injuriously the external and exposed portions of the nervous system, such as the surfaces of the retina, would in like manner affect the brain; and I would draw from this inference the practical rules, that whenever symptoms of giddiness follow smoking, the habit should be discontinued, and that whenever the same symptom occurs in persons who are not habituated to the pipe, the habit should not be acquired.

In reference to the question on which we have seen such divided opinions—the influence of smoking on the mental faculties—there is, I believe, no cause for obscurity. The facts lie in a nutshell. Tobacco, like all agents of its class, has the property of checking the oxydation of the body, and thus of diminishing waste. When therefore mental labour is being commenced, the system being well sustained, and the supply in excess of the waste, then indulgence in a pipe does produce in most persons a heavy dull condition which is difficult to throw off, because it stops the processes of assimilation and destruction, and thus suspends more or less that motion of the tissues which constitutes vital activity. But if mental labour be continued for a long time, until exhaustion is felt—until, in other words, the wasting of the corporeal power is greater than the supply—then the resort to a pipe gives a feeling of relief; it soothes, it is said, and gives impe-

tus to thought; that is to say, it checks the rapid waste that is going on, and enables the mind to bear up longer in the performance of its task. The very same law applies also to physical or muscular exertion.

This explanation gives the key to the practical experiences of almost all smokers. Very few men indeed ever become so habituated to the pipe that they can commence a day of physical or mental work on a good breakfast and tobacco. Many try this, but it almost invariably obtains that they go through their labours with much less alacrity than other men who are not smokers; while the majority of smokers feel that after a day's labour, the resort to a pipe—supposing always that the practice is moderately carried out—produces temporary relief from exhaustion. Further, in many persons of great energy and industry, exertion, either mental or bodily, is often followed up so intensely that they cannot sleep, owing to the actual severity of the effort to which they have subjected themselves. They are excited, and are too tired for rest; the mind is chaotic and revolves rapidly over passing events, retaining nothing long, and dissatisfied with all. In this condition there can be no doubt that a pipe produces a soothing and even salutary effect, causing mental rest, a partial oblivion of the past, and leading to that natural sleep which is to “knit up the ravelled sleeve of care,” and become “chief nourisher in life's feast.”

Let it be understood clearly that I am not advocating the necessity of tobacco as a requirement of the natural life. I am open to the conviction that the excessive labours to which I have referred are altogether contrary to the natural laws of life. I believe that in this day we

have run into the extreme of industry, have carried our exertions to the borders of insanity, and our competition to the extremity of folly : and so it is to be admitted that to the natural man such adventitious aids as tobacco are perfectly unnecessary ; but our social exigencies daily override our philosophies ; and as the individual man cannot by himself create a social revolution, he is too often bound to bend lowly to the stream, and seek in the unnatural conditions in which he is placed, unnatural, or perhaps under the circumstances I might almost say, natural remedies ; for the most natural *remedies* are, in truth, unnatural measures, implying as they do in the necessity that calls for them, a primitive departure from nature.

For the reasons which have been stated above, it follows plainly, that tobacco smoking as a habit is most injurious both to the physical and mental organism in the early periods of life. Whatever may be said for or against tobacco, this is quite certain, that it should never be indulged in until the body is fully developed. During the early periods of life, when the youth is approaching to his manhood, all the physical and mental energies are at their full stretch to attain a certain maximum of growth and power. To throw obstacles, therefore, in the way of this development is necessarily to inflict on it a penalty which is life-enduring, and is never made up ; and I do not think the anti-tobacconists are saying a word too much when they urge that the increasing indulgence by our children and youths in the use of tobacco is stunting the national growth, deforming the national life, degrading the national intellect, and establishing a race which must necessarily possess a

limited force, and transmit its own degradation to the next and the next generation. If, indeed, there is one point upon which parental authority should be exercised, it is, I think, in forbidding the use of tobacco until the child has become a full-grown man and is capable of exercising his own independent and manly judgment.

There remains yet to be considered the question:—Whether the habit of tobacco smoking produces insanity? I believe there is no evidence whatever of the production of any form of insanity by smoking. If such a source of insanity existed, as is supposed, it would show itself immediately and broadly in the differences of numbers between the insane of the different sexes; the proportion of insane male patients would naturally be increased in proportion to the excess of males who smoke, over both insane males and females who do not smoke. But no such a rule is even approached: no special asylum has shown such a rule: no country, through its asylums altogether, has shown such a rule.

But apart from this general argument and statistical inference, we have corroborated evidence in individual experience. If tobacco smoking led to insanity, the fact could not have been overlooked, as it must have been, for ages by the members of the medical fraternity; yet how many of these, of unbiassed turn, could be brought forward who, excluding all other causes, could trace a single instance of any form of insanity back to indulgence in tobacco as the first and only cause?

Independently of other agencies, I believe that tobacco is utterly incapable of causing insanity; and common observation will endorse, I doubt not, this statement.

Still, it may be asked:—Does smoking not urge into activity a predisposition to insanity?

I have tried to examine this question fairly, and if I can arrive at any safe conclusion, it is that the damages committed by tobacco, in the examples under consideration, are fully, and even more than met by the advantages which occasionally follow. Certainly, in insanity attended with extreme excitement, and induced by over-exertion, I have seen a gentle and soothing influence produced by a pipe, which out-bade all narcotics, and acted as a valuable and safe remedy. Nay, even in melancholic conditions—when the mind wanders so rapidly from one thought and one determination to another that no impression is retained, and every act, from prayer to suicide, is done under such terrible impulse, that it is, as it were, performed together with the thought that prompted it—I have seen the soothing influence of tobacco exert, in a marked degree, a good effect. That it may be carried too far is easily and wisely admitted; that it may depress, by undue indulgence, and make matters worse than before, is also to be admitted; but any objection raised on this last-named fact ought, in fairness, to be allowed to extend to every act, however simple, that may be performed by the sufferer; to the exercise he takes, and the food he eats; for these, all-potent to cure, are all-powerful to destroy if unduly applied.

In relation to tobacco in its effects on the nervous system, I have only now to consider its operation on the nervous filaments themselves. The student who may not have paid close attention to the subject of the physiology of the nervous system, should be informed that, in addition to

the nerves of special sense, such as the optic, the olfactory, and the auditory, there are two other distinct systems in the body, the one known as the system of nerves of volition and sensation ; the other as the system of nerves of organic life, or the sympathetic. The first of these sets have their origin from the spinal cord ; they, through the spinal cord, put the extreme parts of the body into communication with the brain, and the brain into communication with the external parts. Thus, when we touch any part of the body, as with the point of a pin, sensation, or it may be pain, is communicated from the point touched, through a filament of nerve to the brain, or sensorium ; when, again, the will directs the hand or foot to move, the direction is ordered, and the muscle, which is the moving organ, is bidden to move, through a volitional nerve from the brain.

The second system of nerves, the sympathetic, lies within the cavities of the body ; the nerves extend from a number of small centres to the internal viscera, to which they are distributed. These nerves supply those organs of the body which work independently of the will, such as the heart and the stomach ; they govern secretion also and excretion. Indirectly, they may be influenced through the brain ; but, as a general rule, they act through forces conveyed to their own centres.

Does tobacco then exert any power over either of these sets of nerves ? If it exerted any injurious action over the spinal cord, or the nerves arising out of it, the mischief would show itself in the production of external insensibility, or in disturbed action of the muscles, in convulsion or paralysis. If, again, it exerted any action over the sympathetic nerves, it would either cause increase or decrease

of the functions and the secretion of the organs to which these nerves are distributed.

The fact is demonstrative that tobacco has the power of modifying the functional activity of both systems of nerves. The nicotine plays a very important part on the motor fibres of the spinal nerves, and probably on the cord itself. It excites through these structures muscular agitation, followed by temporary suspension of action, paralysis ; and there can be no doubt that the blood could be made to absorb sufficient nicotine from burning tobacco to paralyse all the voluntary nerves.

In like manner, tobacco smoke has the property of acting on the sympathetic system of nerves, exciting them first to produce muscular spasm, to be followed by deficient power. It is owing to this circumstance that internal pain is produced, together with spasm of the stomach and vomiting, during the first attempts at smoking. It is from the same circumstance that the heart palpitates, and then becomes enfeebled. It is from the same cause, long-acting, that the organs of organic life become so sluggish and powerless in confirmed smokers.

But tobacco also exerts a temporary action through the sympathetic nerves over those structures which afford the secretions—the glands. Thus, in the early stages of smoking, it excites free secretion, probably, from all the glands of the alimentary canal ; and in regard to the salivary glands, it retains this power in the individual often throughout life. Probably it similarly affects the pancreas, and the other glands lower in the digestive system. In ordinary smoking, I do not think anything important occurs except over secretion, at least in the majority of cases ; but in

immoderate smokers the over-action may run into paralysis, and the secretions may become reduced instead of augmented.

Reviewing the whole question of the influence of tobacco on the organs of sense, the brain, and the nerves proper, the sum and substance of the argument is, that the mischiefs produced on these structures are transient and evanescent; the organs, that is to say, suffer only while they are under the influence of the poison; relieved from this, they recover their wonted activity with wonderful rapidity. We cannot have a better illustration of this fact than in what is daily observed in persons who during the act of smoking secrete a large quantity of saliva. So long as the nerves of the salivary glands are exposed to the action of the tobacco, the secretion poured out is profuse and uncontrollable; but so soon as the tobacco is withdrawn, the free secretion is stopped, and the gland resumes its duties in the natural order.

CHAPTER VIII.

EFFECTS OF SMOKING ON THE MOUTH.

I PROPOSE in the present chapter to touch briefly upon the effects produced by smoking on the structures of the mouth. This very important subject has given rise to repeated discussions and considerable warmth of argument. We will divest ourselves of all bias, and accept, as far as we can, the simple facts presented to us, as our guides to a correct conclusion.

It will help us in our inquiry if we take into consideration the structures in the mouth that are liable to injury. It will be remembered, in the first place, that along the edge of each lip there is a point where the common external skin, changing its character, becomes red in appearance, and smooth and bright. Let the eye be carried from the cheek to the inner surface of the lips and mouth, and the difference is at once detected. The real difference of these appearances lies in this, that at the commencement of the lips the ordinary skin of the body is slightly transformed in structure. Here too it receives a new anatomical name, *mucous membrane*. This membrane

is very much like to skin in its nature, and when washed, so as to be freed from blood, is nearly identical in appearance. It covers the surface of the mouth, and extends through the gullet to the stomach, and so on throughout the whole of the alimentary canal. It may easily be lifted up and removed, or may be torn, abraded, or ulcerated. Examined minutely, it is found to be made up of four layers; of a layer of fine scales called the epithelium; of a layer of firm and simple structure on which these scales rest, called the basement; of a layer beneath, known as the vascular layer, in which the nerves, blood vessels and glands are imbedded, and of a still lower layer of loose tissue for binding the membrane to the structures which it covers. The mucous membrane is well supplied with glands or secreting bodies. The ducts or open tubes of those glands which produce the saliva, pass through the mucous membrane into the mouth; while in the back of the mouth and throat there are numerous small glands, and other bodies known as follicles, which constantly supply some amount of secretion. Again, at the back of the mouth there are two bodies on each side, called tonsils, and a central structure projecting downwards, called the uvula. Nor must we forget in this summary of the parts of the mouth, the gums and the teeth.

What influence then has the smoke of tobacco on the structures named above?

In all cases there is excited in the young smoker an over-action of the glands of the mouth, and especially of the salivary glands. This over-action is felt only during the act of smoking, and in certain persons there is very little over-action even then. But, as is well-known, in the

large majority of smokers there is set up a copious salivation, leading to expectoration, and to the employment of that very unsightly piece of furniture, which every housewife abhors, "the spittoon." We may leave the article of furniture, and the act which it suggests, as the only objectionable parts of the process; for I believe there is not a particle of reliable evidence to show that the salivation temporarily produced has any effect on the health. The argument has been, that as the saliva is necessary for the process of digestion, to divert it is to destroy, to a considerable extent, the power of digestion. The argument might be true if men smoked and ate at the same moment; but as this is impossible, and as in smokers generally there is, as a rule, an increased, rather than a diminished tendency to action of the salivary glands, it is not very easy to see how any loss of saliva during eating can occur from smoking. On the other side, if men must smoke, they are relieved by expectoration. It is commonly thought that men who do not expectorate, do not produce an excess of saliva; but the fact is, that the saliva, produced in the same immoderate quality, is swallowed by these last-named persons, and, taken into the system, is made the vehicle for the conveyance of those soluble but more fixed substances of tobacco, the nicotine and the bitter extract, which in physiological action are most pernicious.

One evil of a local kind does, however, sometimes accrue from the profuse flow of salivary fluid. The saliva contains, in solution, salts of lime, which, existing in excess, are liable to deposit, and to form hard stone-like masses in the ducts of the salivary glands, or to be laid down on the teeth in a calcareous layer, constituting the

crust called tartar. I have seen these results follow many times; but they are not necessary accompaniments, since they may be prevented by strict attention to cleanliness. The daily employment of a little pure vinegar in the water used for cleaning the mouth, and brushing the teeth, is, in truth, an effectual preventive measure against calcareous deposit and accumulation.

In respect to the smaller glands of the mouth, and the follicles, and the tonsils, an injurious influence is unquestionably exerted on them by tobacco. There is, in fact, a form of soreness of the throat—the disorder has been most ably described by Dr. Gibb—in smokers, which may be considered as peculiar to them. The disease consists of an irritable state of the mucous membrane at the back of the throat, redness there, dryness, a tendency to cough, and a large soft sore condition of the tonsils, rendering every act of swallowing painful and difficult. The state thus described is in no way to be considered as permanent when it has been excited, nor as universal amongst smokers, but it is occasionally difficult of cure, and it is far more general than is commonly known. I once examined the throats of fifty smokers, in order to determine the question, and I found in them the enlargement of tonsil so frequently, and the other appearances indicated so marked, that I think I could detect an immoderate smoker by this sign alone. It often happens, indeed, that the enlargement of the tonsils exists for a long time without giving any sufficient indications: but there comes on a damp, cold, foggy state of the air, and then the evil, becoming exaggerated, is troublesome and painful; enlargement of the tonsils is detected, and the annoyance is

markedly increased by any attempt, however brief, to indulge in a pipe. In the fifty cases to which I have referred, thirty-seven had enlargement of tonsil.

In watching the progress of this disorder, which may very properly be called "the smoker's sore throat," it is observable that all the mischief is on the surface of the mucous membrane; it does not extend deeply into the tissues; it does not give rise to abscess, rarely to ulcer: it exists usually as an enlargement, with thickening of the mucous membrane, and profuse secretive action of the small glands, leading to soreness, exfoliation, actual mechanical difficulty in swallowing, and, it may be, to imperfection in speaking and singing. I have known it affect a public singer very seriously, producing a hoarseness, and a want of firmness that was most annoying and painful.

The "smoker's sore throat" is more easily induced by the use of cigars than of pipes. When once it is established in its acute form, it is quite incurable so long as the cause that excited it is allowed to continue; but it soon disappears when the cigar or the pipe is laid aside, and in respect to the body, generally, it leaves no dangerous symptom behind.

The mucous membrane, superficially, is also exposed to another change from very immoderate smoking. Its surface may be rendered dry, shining, and raised, and it may be made so irritable that when hot foods, or acid foods, are taken into the mouth they occasion a considerable degree of sharpness and pain. In extreme instances, the membrane, very much thickened, pale, and leathery, peels off in small roundish patches from the upper surface of

the tongue, leaving a red sore structure exposed. The remedy is to remove the cause, and that quickly.

On the gums, smoking produces two effects. It usually causes paleness and an undue firmness and contraction. Again in rare instances, where from the pressure of decayed teeth the gums are tender, smoking seems to induce vascularity and transudation of blood from them, with tenderness and swelling: but these are not the pure results of tobacco—they are aided by previous local mischief, and often by constitutional taint.

In some instances, together with the enlargement of the tonsils, there is elongation and soreness of the uvula. The cause here is the same, the course of the symptoms is the same, and the remedy is the same.

On the teeth themselves, setting aside the accumulation of tartar, I do not think tobacco smoke exerts any injurious influence. Nay, to speak fairly, I believe that the smoke has a tendency to preserve, rather than to destroy these important organs. It leaves upon them, truly, in unclean persons, a deposit of carbon which stains the white enamel black: but by virtue of its antiseptic action on acid and decomposing animal and vegetable substances, which so materially, by their presence, produce decay, tobacco-smoke counteracts much mischief.

Before leaving the subject now under notice there is one other all-important question to be considered, viz:—Does smoking produce cancer of the mouth? I must leave this point of inquiry for discussion in a special chapter.

CHAPTER IX.

DOES SMOKING PRODUCE CANCER ?

THE question placed above, owing to the weight that is attached to its proper solution, is deserving of consideration in a special manner. I have heard, as well as read, on this question opinions so wild and so extreme that I can scarcely hope to write in such a way as to gain no displeasure. In this dilemma there is, as Defoe has correctly suggested, no course before the writer but to proceed, irrespective of all censure, and to state the plain truth, whether it excite praise or blame.

The first observations that were made on the origin, real or supposed, of cancer, from the use of tobacco, were confined to those forms of the disease in which it appears in the lips. But after a time the assumed danger grew and grew, until it has become a fixed belief amongst a large section of the public, that cancer, in its general interpretation as a disease, may be produced by smoking, and that, in a word, the terms "tobacco" and "cancer" may be classed together in the order of cause and effect.

It is proper at once to break through this absurd fallacy, a fallacy which is singularly glaring from its marked opposition to all experience, past and present. For instance, the disease was present in Europe before tobacco was introduced as a luxury ; hence the cause of cancer existed before the use of tobacco. But it is a law to which there is not an exception, that no disease can have *two* causes ; so that if only one example of cancer were extant in a community previously to the introduction of tobacco into that community, the fact were decisive against the hypothesis of tobacco being a generic cause of cancer.

But we have further evidence in the experiences by which we are surrounded. We find the disease in the inferior animals, in all the domestic animals, and even in some which we might imagine would possibly be removed from it. Thus, Dr. Crisp has discovered the disease in the fish called the pike,—an animal which no enthusiast, surely, will ever accuse of going to bed on a cigar.

When to these facts we add this last, that as a whole, cancer is most prevalent in our own community amongst the members of the female sex, who, as a general rule, do not smoke, we require no further proof that tobacco must be entirely separated from cancer as the constitutional cause of that particular malady.

We will move next from the general to a special question. Can smoking excite locally—as in the lips, the tongue, or the throat—the disease cancer ? The answer to this question must be indirectly in the affirmative ; but to understand the position rightly, it is necessary to have a clear idea on certain points connected with the natural history of the disease altogether. I will explain these

points as simply as I can without leaving the pure science in which they are involved. In a broad point of view, cancer is to be accepted as a local disease developed on a previously existing and general derangement of the nutrition of the body. Up to this time we have not the faintest glimpse as to the nature of this primitive departure from health, nor as to its cause. It is supposed that the blood has undergone some peculiar change, but the blood has been analyzed by the chemist and inspected by the microscopist without yielding any one result of an explanatory kind. Various causes have been assumed—varieties of climate, for instance, peculiarities of race, specialities of food, modified conditions of air, occupations, indulgencies in luxuries—but not one hypothesis has stood its ground under rigid investigation. Notwithstanding all this admitted ignorance, certain facts have been made out which are of deep interest. Thus it seems to be proved, that in about one in six instances of the disorder, it is transmitted, hereditarily, from parent to child. Secondly, it is made out that the disease is transmitted from the mother to the child very much more frequently than from the father to the child. Thirdly, it is known that the disease is prone to develop itself in certain particular organs of the body. Fourthly, that it takes, in its local manifestations, different forms, from which have arisen particular names, such as “hard cancer,” “soft cancer,” and the like, all of which forms rest on the same basis, but assume different appearances according to the part attacked, or the condition of the part at the period of the attack. Fifthly, it has been proved that, as a general rule, the disorder does not show itself definitely until the

victim of it is approaching middle age, although to this rule there are exceptions, sometimes extreme in kind; as for instance, one recorded by myself in a Fothergillian Prize Essay, where an infant was actually born suffering from cancer. Lastly, experience has taught us that when the disposition to cancer exists, it may be brought into full development at some particular part of the body by any cause that shall irritate that part so as to excite in it an over-active nutrition.

This last consideration brings us directly to the question whether smoking can light up in persons predisposed to cancer the active disease; if it can, it does it clearly by acting as a substance irritating the parts with which it comes in contact, the lips, the mouth, the tongue, or the throat: all other parts may be safely excluded.

From what was said in the last chapter, it might almost be inferred—theoretically, yet safely—that in persons of strong cancerous tendency the irritation produced by the smoking of tobacco would call into existence the local and much-dreaded mischief. But the truth is, that such occurrences are extremely rare, so rare in fact, that I can recall no instance where cancer, either of the tongue, throat, or cheek, could be connected with the use of tobacco. I have seen cancer of the tongue excited by friction of the tongue against a rough decayed tooth. I have seen cancer of the throat called forth by the irritation arising from the lodgement of a fishbone; and I have seen the tumour form and progress in these parts without any apparent reason; but I have never met with a single instance in which tobacco smoke could be said to have brought out the acute disorder. On the contrary, all examples of this kind which

I have seen, have, singularly enough, occurred in persons who did not smoke. If I were inclined to run into an extreme, I might indeed argue from the facts in my possession that the effect of tobacco was to stop the local change constituting the visible disease ; but this argument would be unfair, because the experience of any one individual is too limited to allow him to speak dogmatically upon it. I content myself therefore with simply stating the fact that cancer of the mouth may occur, and does occur, in persons who do not smoke ; that it does not specially occur in persons who do smoke ; and that any extreme view in reference to tobacco as an exciting cause of cancer of the mouth, is without foundation.

There is still one other form of cancerous disease which deserves consideration ; I mean cancer of the lower lip. The lower lip is affected, not unfrequently, in the predisposed, with a variety of cancer called from its spreading and superficial character "epithelial cancer." It has been observed unquestionably of this cancer that it occurs frequently in persons who smoke short pipes, and that it breaks out at that part of the lower lip where the pipe produces an impression. Here therefore we may, without hesitation, assume that smoking excites the cancerous disorder ; but as I said some time since, this exciting cause is indirect in its action, inasmuch as it is connected with the pipe, and not with the tobacco ; for it has been found by experience that the mischief does not become developed in cigar smokers, nor even in those who smoke pipes having a smooth surface, and which are of sufficient length, and as a consequence are cool—but that the accident happens mainly from the use of the short cutty pipe, which

is held very firmly in the lips without any support from the hand, and conveys to the lip considerable heat, amounting sometimes almost to pain.

Those who are opposed to tobacco will naturally accept the fact above given as a condemnation of the weed. Those who advocate tobacco, on the other hand, will assert that the statement, if true, tells nothing against tobacco itself, but simply against an objectionable way of using it; and I confess that this latter view of the subject is the one with which I should agree. Nay, I do not know whether something more may not be said even on the tobacco side of the controversy; for the truth is this, that whenever the pipe brings out the disease, as we have seen, there existed in the person affected a strong predisposition which would, almost to a certainty, have become developed in some one part or other of the body, if it did not break out in the lip. Under such circumstances the life of the sufferer will be considerably lengthened or shortened, according to the point at which the disease manifests itself; but if there is one point of the body more favourable than another for the development of cancer, it is the lip, and if there is one form that is more open to cure by operation than another, it is the epithelial cancer which occurs in the lip. Hence in the run of cases, it may rather be an advantage than otherwise that the cancerous disease should be thrown out at a spot where, for a time at least, it may divert the development of the fatal growth from more vital organs, and where, in extremity, it lies within the reach of treatment, and even of cure.

CHAPTER X.

DOES TOBACCO PRODUCE CONSUMPTION OR CHRONIC BRONCHITIS ?

IN the question proposed above, we have to consider a subject on which there are doubts amongst the learned as well as the unlearned; the wise and calm as well as the ignorant and over enthusiastic. Even while these papers have been in course of publication, a French practitioner, M. Mercier, has been commenting on tobacco as a cause of chest complaint, and lending the strength of his observations to the view, that incessant smoking has the power of producing bronchial irritation, and of keeping up a painful, troublesome, and even dangerous cough. I have often heard medical brethren in this country adduce cases in which, as they believed, the first symptoms of *consumption* were observed to follow and depend on over indulgence in tobacco; and certain it is also, that I have been driven, by the force of repeated and, as it seemed to me, conclusive experience, to trace certain mischiefs, in individual examples, back to the use of the pipe or cigar; nay, I am morally sure that in many such instances, great and lasting good has been effected by forbidding a continuance of the luxury.

I am not inclined either, after what has to be told, to

deny that considerable damage may follow from smoking during certain peculiar conditions of system which have been brought on by other and more determinate causes ; but I am at the same time obliged to express a doubt, after a rigid analysis of all the facts in my possession, whether smoking can be adduced as a prime cause of chest disease. I have been fortunate in having at command unusual facilities for conducting an inquiry into the precise relationships that exist between the practice of smoking and the presence of disease of the lungs. My position as a physician to the " Royal Infirmary for Diseases of the Chest," has given me the opportunity of instituting an analysis, such as has not before been attempted ; and to this analysis I would now direct the reader.

The plan adopted in the collection of the facts, was very simple : the apothecary of the Infirmary was directed as he entered down the name, address, age, and duration of illness of each patient, to add to the record, in the cases of all persons, except children, the information whether they did or did not smoke. The apothecary had nothing to do in the matter of inquiry into the nature of the disease ; that was left for me to determine ; and as during the greater part of the time in which the investigation was carried on, I saw, by rule, only six new patients per day, I had leisure to make myself sure of the precise nature of each form of disease that came before me. The inquiry commenced on the eighth of October, 1860, and was continued for nearly three years : then I turned to the books and extracted the facts which they conveyed.

These books afford reliable data, and they tell us in respect to the two most prominent, and indeed the only

two diseases of the chest that we need specially discuss—I mean Consumption and Chronic Bronchitis—the following series of facts.

In regard to Consumption:

There came under notice—

Cases to the total number of	361
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Out of this total, there were—

Persons who did not smoke	225
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Persons who did smoke or who had smoked	136
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Thus out of 361 consumptive persons—

Those who did <i>not</i> smoke showed an excess of	89
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Out of the total of 361, there were—

Males	230
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Females	131
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Out of the 230 males—

The number who smoked was	136
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The number who did not smoke was	..	94
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Thus out of 230 consumptive males—

The smokers showed an excess of	..	42
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In regard to Chronic Bronchitis, including Asthma:—

There came under notice—

Cases to the total number of	475
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Out of this total, there were—

Persons who did not smoke	338
Persons who did smoke or who had smoked		137

Thus out of 475 persons suffering from Chronic
Bronchitis—

Those who did <i>not</i> smoke showed an excess of	201
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Out of the total of 475 there were—

Males	249
Females	226

Out of the 249 males—

The number who smoked was	137
The number who did not smoke was	..	112

Thus out of 249 males suffering from Chronic
Bronchitis—

The smokers showed an excess of	..	25
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It suffices to read the figures given above, to feel that neither consumption nor bronchitis, in the chronic form, can be induced, primarily, by smoking; for while it is true that, amongst the men, those who smoke were the most numerous of the sufferers from both diseases, we are bound to accept this circumstance as coincidental merely. Had the persons whose cases were recorded been in health; had they been passing before a recruiting sergeant for entry into military service, for instance; there would have been a similiar comparison, in regard to numbers, between the smokers and those who

did not smoke. We are obliged, consequently, to say simply, that amongst male sufferers from consumption and bronchitis, a majority indulge in smoking. Taking the whole of my cases, fifty-seven per cent. ranked as smokers, forty-three per cent. as not smokers.

But it would obviously be false to this question to let it rest solely on the statistics derived from one sex : women are as susceptible to the two diseases named as are men. Here then is a touchstone. Are women, who as a body are not smokers, and men who are not smokers, if placed together as one class, less subject to these disorders than men who are smokers ? We turn to our tables and find that the combined class is *not* less subject, and that on the large scale the luxury of smoking does not come into the list of causes at all.

Smokers in general will doubtless breathe more freely after this exposition ; but it would be unfair were they to be allowed to read these facts singly and unqualified. When it is said that tobacco is not a cause of the diseases to which attention is now being called, it is not also conveyed that when these diseases are once set up, tobacco does not aggravate them ; or that when certain efficient causes are at work to induce these affections, that tobacco does not lend weight to the result. I am convinced it does both these things, and I could quote example upon example where persistence in smoking has tended to sustain and confirm the malady. This is most true in regard to consumption ; for consumption is a disease which, with hereditary taint often lying at the bottom of it, is essentially a disease of bad air, a disease due to the long continued inhalation of an air containing an excess

of carbonic acid. It is a disease in which there is a deficient oxidation, and of necessity it is a disease that is intensified when the sufferer from it inhales, in the smoke of tobacco, carbonic acid itself, and not this alone, but various other gases, the action of which on the blood is similar in character. There is also another way in which tobacco does harm to consumptive persons: there is never any affection of the lungs, never any arrest in the process of breathing, without some derangement in the digestion. Indirectly, the stomach requires oxygen; and without oxygenated blood it fails to produce, freely, its digestive fluid: thus fresh air gives appetite. But smoking, as every one knows, if too much indulged in, destroys appetite and enfeebles digestion, and consumption does the same thing. In fact one of the most common presages of consumption is indigestion. Such indigestion, intensified by the act of smoking, adds trouble upon trouble, and hastens that destruction which the disease of itself is sufficiently competent to enforce.

For these reasons I have made it a rule for years past to insist on every consumptive patient yielding up the pipe or cigar; and I have found a rigid adherence to this rule worth many a formal prescription.

In Chronic Bronchitis, the use of tobacco, in the ordinary run of cases, is also injurious. The smoke acts as an irritant to the irritable surface of the bronchial tubes; it keeps up cough, it increases indigestion, which in this disease, as in phthisis, and for the same reasons, is a troublesome attendant, and it stands constantly in the way of successful treatment. Like M. Mercier, I have seen

many times, in persons who smoke. a cough following upon a cold, remain persistently until smoking has been suspended ; then disappear as if by magic.

It is well, at the same time, not to be too dogmatic respecting the faults of tobacco in *all* bronchial affections. There is a spasmodic bronchitis, which is often called asthma, for which tobacco, by inhalation in smoking, is a useful palliative during the extreme paroxysm. I know an aged gentleman who, bordering on ninety years, has suffered from this spasmodic disorder for more than half a century. To him, tobacco has been a positive blessing, rendering his life endurable, and, as I think, prolonging it. But these exceptional cases are rare, very rare, and it would be foolish to stand up for tobacco smoking on them, seeing that the physician has in his repertory other means equally beneficial and not more objectionable.

CHAPTER IX.

SUMMARY.—FOR AND AGAINST TOBACCO.

IN preceding chapters I have endeavoured to describe in detail, all the effects produced on the body by tobacco as it is used by those who smoke. Condensed into a few sentences, the details may be placed in the following summary.

1. The effects that result from smoking are due to different agents imbibed by the smoker: viz., carbonic acid, ammonia, nicotine, a volatile empyreumatic substance, and a bitter extract. The more common effects are traceable to the carbonic acid and ammonia; the rarer and more severe to the nicotine, the empyreumatic substance, and the extract.

2. The effects produced are very transitory, the poisons finding a ready exit from the body.

3. All the evils of smoking are functional in character, and no confirmed smoker can ever be said, so long as he indulges in the habit, to be well; it does not follow, however, that he is becoming the subject of organic and fatal disease because he smokes.

4. Smoking produces disturbances: (*a*) In the *blood*, causing undue fluidity, and change in the red corpuseles: (*b*) on the *stomach*, giving rise to debility, nausea, and in extreme cases, sickness: (*c*) on the *heart*, producing debility of that organ, and irregular action: (*d*) on the *organs of sense*, causing in the extreme degree dilatation of the pupils of the eye, confusion of vision, bright lines, luminous or cobweb specks, and long retention of images on the retina; with other and analogous symptoms affecting the ear, viz., inability clearly to define sounds, and the annoyance of a sharp ringing sound like a whistle or a bell: (*e*) on the *brain*, suspending the waste of that organ, and oppressing it if it be duly nourished, but soothing it if it be exhausted: (*f*) on the *nervous filaments and sympathetic or organic nerves*, leading to deficient power in them, and to over secretion in those surfaces—glands—over which the nerves exert a controlling force: (*g*) on the *mucous membrane* of the mouth, causing enlargement and soreness of the tonsils—smoker's sore throat—redness, dryness, and occasional peeling off of the membrane, and either unnatural firmness and contraction, or sponginess of the gums: (*h*) on the *bronchial surface of the lungs* when that is already irritable, sustaining the irritation, and increasing the cough.

5. The statements to the effect that tobacco smoke causes specific diseases, such as insanity, epilepsy, St. Vitus dance, apoplexy, organic disease of the heart, cancer, consumption, and chronic bronchitis, have been made without any sufficient evidence or reference to facts; all such statements are devoid of truth, and can never accomplish the object which those who offer them have in view.

6. As the human body is maintained alive and in full vigour by its capacity, within certain well-defined limits, to absorb and apply oxygen; as the process of oxydation is most active and most required in those periods of life when the structures of the body are attaining their full development; and, as tobacco smoke possesses the power of arresting such oxydation, the habit of smoking is most deleterious to the young, causing in them impairment of growth, premature manhood, and physical degradation.

If the views thus epitomized, in relation to the influence of tobacco smoking on individuals, are true, we are led without any difficulty to the consideration of the influence exerted by the habit on communities and on nations. That which smoking effects, either as a pleasure or a penalty, on a man, it inflicts on any national representation of the same man, and taking it all in all, stripping from the argument the puerilities and exaggerations of those who claim to be the professed antagonists of the practice, it is fair to say, that, in the main, smoking is a luxury which any nation, of natural habits, would be better without. The luxury is not directly fatal to life, but its use conveys to the mind of the man who looks upon it calmly, the unmistakeable idea of physical degradation. I do not hesitate to say that if a community of youths of both sexes, whose progenitors were finely formed and powerful, were to be trained to the early practice of smoking, and if marriage were to be confined to the smokers, an apparently new and a physically inferior race of men and women would be bred up. Of course such an experiment is impossible as we live: for many of our fathers do not smoke, and scarcely any of our mothers, and thus, to the credit

of our women, chiefly, be it said, the integrity of the race is fairly preserved: with increasing knowledge we may hope that the same integrity will be further sustained: but still, the fact of what tobacco can do, in its extreme action, is not the less to be forgotten, for many evils are maintained because their full and worst effects are hidden from the sight.

Again, on the ground of the functional disturbances to which smoking gives rise in those who indulge in it, an argument may be used which goes very deeply, and cuts none the less sharply because, in one sense, it is ridiculous. Put down the smokers of Great Britain at a million in number—they are more than that, but let it pass:—Why should there exist perpetually a million of Englishmen, not one of whom can at any moment be writ down as in perfect health from day to day? Why should a million of men be living with stomachs that only partially digest, hearts that labour unnaturally, and blood that is not fully oxydized? In a purely philosophical point of view, the question admits of but one answer; viz., that the existence of such a million of imperfectly working living organisms is a national absurdity, a picture which, to a superior intelligence observing the whole truth and grasping it, would suggest a mania, foolish, ridiculous, and incomprehensible.

I cannot say more against tobacco, however, without being led into a wider question; I mean the use of luxuries altogether; on which question, if I were equally fair for tobacco as against it, I should be forced to give it a place as one of the least hurtful of luxuries. It is on this ground, in fact, that tobacco holds so firm a position:—that of nearly every luxury it is the least

injurious. It is innocuous as compared with alcohol, it does infinitely less harm than opium; it is in no sense worse than tea or sugar; and by the side of high living altogether it contrasts most favourably. A thorough smoker may or may not be a hard drinker, but there is one thing he never is, a glutton; indeed there is no cure for gluttony and all its train of certain and fatal evils, like tobacco.

The friends of tobacco will add to these remarks, that their "friendly weed" is sometimes not only the least hurtful of luxuries, but the most reasonable. They will tell of the quiet which it brings to the overworn body, and to the irritable and restless mind: their error is transparent and universal, but universal error is practical truth; for, in their acceptation, tobacco is a remedy for evils that lie deeper than its own, and as a remedy it will hold its place until those evils are removed. The poor savage, from whom we derived "tabac," found in the weed some solace to his yearning vacuous mind, and killed by it wearisome lingering time. The type of the savage, extant in modern civilised life, still vacuous and indolent, finds "tabac" the time-killer; while the overworked man discovers in the same agent a quietus, which his exhaustion having once tasted, rarely forgets, but asks for again and again. Thus, on two sides of human nature we see the source of the demand for tobacco, and until we can equalise labour, and remove the call for an artificial necessity of an artificial life, tobacco will hold its place, with this credit to itself, that, bad as it is, it prevents the introduction of agents that might be infinitely worse.

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